National Framework Datasets - Soil Biodiversity

Genomic datasets to investigate the diversity and function of Australian soils.

Bioplatforms Australia has launched an important project to map soil biodiversity in Australia. Soil hosts diverse microbial communities that play a critical role in the many ecological processes that underpin agricultural enterprises and influence our natural landscapes. Despite this elemental role, soil communities are not well characterised in Australia or the rest of the world.

This new project is bringing together leading researchers to investigate the diversity and ecological function of Australian soils in a way that has not been done before.

Biome of Australian Soil Environments (BASE)

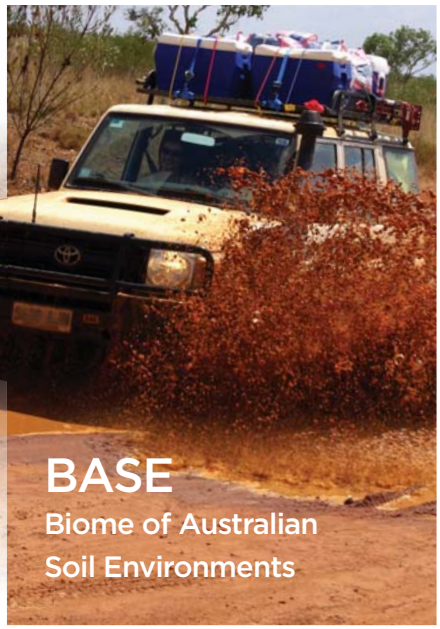
Titled the Biome of Australian Soil Environments (BASE), this important project offers unique opportunities to describe the communities of microscopic organisms that exist in soil and define their intrinsic relationship with plants, soil health and agricultural productivity. Soil samples from different regions and land uses are being collected and analysed to create a reference map of Australian soil and enable detailed research on the microbial communities extracted from each site.

Why is BASE Important?

Comprehensive mapping of Australian soils has not been undertaken before and offers many discovery opportunities. Researchers will be able to investigate the role soil microbial communities play in many ecological processes such as carbon cycling, degradation of contaminants and defense against soil borne diseases. BASE will provide the datasets needed to both define and model different microbial communities and relate their structure and function to contrasting environments, vegetation and land use. Such research is critical to achieving ecological stability and sustainable agricultural production.

A DNA Approach

Soil microbial communities are composed of many different organisms and the BASE project will employ innovative DNA-based techniques to analyse bacteria, fungi and algae. Modern genomics technology permits more rapid and cost effective DNA sequencing than conventional techniques and this new approach will enable a much deeper understanding of soil communities not previously possible. Bioplatforms Australia will create large genomics datasets for BASE in collaboration with soil experts. The datasets will be linked with contextual data such as soil chemistry, GPS information and environmental observations. This will give an expanded view of soil communities and their symbiotic and co-evolutionary relationship with plants. Ultimately it will also allow researchers to quantify and compare different soil communities across Australia.



Soil Samples

Characterising Australia's soil diversity means that samples need to be collected from contrasting ecological environments. BASE is targeting sites from native vegetation areas together with a wide range of agricultural sites across subtropical, temperate and high rainfall regions. It also targets a broad range of soil types from heavy clay loams to light sandy soils.

Soil samples are being collected from national reserves and agricultural monitoring sites. Access to these and other sites together with land-use history will ensure a continent-wide inventory of biodiversity and enable relevant research into soil resilience and agricultural productivity.

A Public Resource

BASE data will be made publically available for the benefit of broader research applications. Soil datasets can be linked with existing overland surveys, meteorological data, geological data and other knowledge of the Australian continent and its land use.

BASE will also align and partner with the Earth Microbiome Project, an international effort which aims to characterise more than 200,000 microbial samples from around the world.

Project Partners

Bioplatforms Australia facilities will perform the DNA recovery and sequencing aspects of the project and collate the genomics data. The project represents a partnership with the CSIRO, various government departments, universities and research and development corporations to gather samples, develop new research tools and analyse results. Collaborators include:

- Atlas of Living Australia
- Australian Antarctic Division
- Australian National Data Service (ANDS)
- CSIRO
- Department of Agriculture, Forestry and Fisheries
- Department of Environment and Conservation, Western Australia
- Department of Primary Industries Victoria
- Department of Sustainability Environment Water Population and Communities (SEWPAC)
- Grains Research and Development Corporation
- La Trobe University
- Science and Industry Endowment Fund (SIEF)
- South Australian Research and Development Institute (SARDI)
- Tasmanian Land Conservancy
- Terrestrial Ecosystem Research Network (TERN)
- University of Adelaide
- University of New South Wales
- University of Queensland
- University of Western Australia
- University of Western Sydney

CAN YOU HELP?

If you are able to support BASE or can offer relevant research or industry expertise, please contact Dr Anna Fitzgerald at afitzgerald@bioplatforms.com

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Bioplatforms Australia is responsible for building scientific infrastructure in the specialist fields of genomics, proteomics, metabolomics and bioinformatics. It supports Australian life science research with crucial investments in state-of-the-art technologies and cutting edge expertise. Investment funding has been provided by the Commonwealth Government's National Collaborative Research Infrastructure Strategy (NCRIS) and the 2009 Super Science initiative. Co-investments have also been made by State Governments, research institutes and commercial entities. Bioplatforms Australia aims to promote broad access to Australia's world class 'omics capabilities to maximise the scientific endeavours of the Australian research community.

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